

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A traveling-wave electroabsorption modulator configured to function simultaneously as a photodetector, a demultiplexer, and an optical pulse generator for clock-recovery and demultiplexing.

Claim 2 (Currently Amended): An apparatus for simultaneous photodetection, demultiplexing and optical pulse generation, comprising[[:]]:

a traveling-wave electroabsorption modulator; and  
a phase-locked loop (PLL) coupled to said traveling-wave electroabsorption modulator[[:]],

wherein said traveling-wave electroabsorption modulator and said PLL are configured for simultaneous photodetection, demultiplexing and optical pulse generation at a line rate ~~on~~ the order of about 40 Gb/s.

Claim 3 (Currently Amended): An apparatus as recited in claim 2,  
wherein said traveling-wave electroabsorption modulator includes a first port coupled to the PLL ~~for outputting~~ and configured to output a photocurrent, and a second port coupled to the PLL,

wherein the photocurrent from the first port of said traveling-wave electroabsorption modulator provides a tone to said PLL, and

wherein said PLL provides a recovered electrical clock signal to the second port of said traveling-wave electroabsorption modulator.

Claim 4 (Currently Amended): An apparatus for simultaneous photodetection, demultiplexing and optical pulse generation, comprising:

a traveling-wave electroabsorption modulator, and  
a phase-locked loop (PLL) coupled to said traveling-wave electroabsorption modulator[[:]],

wherein said traveling-wave electroabsorption modulator and said PLL provide simultaneous photodetection, demultiplexing and optical pulse generation at a line rate ~~on the~~ order of about 40 Gb/s.

Claim 5 (Currently Amended): An apparatus as recited in claim 4,

wherein said traveling-wave electroabsorption modulator includes a first port coupled to the PLL ~~for outputting~~ and configured to output a photocurrent, and a second port coupled to the PLL,

wherein the photocurrent from the first port of said traveling-wave electroabsorption modulator provides a tone to said PLL, and

wherein said PLL provides a recovered electrical clock signal to the second port of said traveling-wave electroabsorption modulator.

Claim 6 (Currently Amended): An apparatus for simultaneous photodetection, demultiplexing and optical pulse generation, comprising:

a first traveling-wave electroabsorption modulator;  
a second traveling-wave electroabsorption modulator in series with said first traveling-wave electroabsorption modulator; and

a phase-locked loop (PLL) coupled to said second traveling-wave electroabsorption modulator[[:]],

wherein said first and second traveling-wave electroabsorption modulators and said PLL provide simultaneous photodetection, demultiplexing and optical pulse generation at a line rate ~~on the order of~~ about 160 Gb/s.

Claim 7 (Currently Amended): An apparatus as recited in claim 6,

wherein said first traveling-wave electroabsorption modulator includes a first port coupled to said second traveling-wave electroabsorption modulator, ~~and~~

wherein said second traveling-wave electroabsorption modulator includes a ~~first~~ second port coupled to the PLL ~~for outputting~~ and configured to output a photocurrent, and a ~~second~~ third port coupled to the PLL,

wherein the photocurrent from the ~~first~~ second port of said second traveling-wave electroabsorption modulator provides a tone to said PLL, and

wherein said PLL provides a recovered electrical clock signal to the ~~second~~ third port of said second traveling-wave electroabsorption modulator and to ~~[[the]]~~ a fourth port of said first traveling-wave electroabsorption modulator.

Claim 8 (Original): A clock recovery apparatus for an all-optical 3R regenerator, comprising:

a traveling-wave electroabsorption modulator configured for optical clock recovery and outputting of a recovered optical clock signal to an all-optical 3R regenerator.

Claim 9 (Currently Amended): An apparatus for optical clock recovery, comprising:  
  
a traveling-wave electroabsorption modulator; and  
  
a phase-locked loop (PLL) coupled to said traveling-wave electroabsorption modulator[[]],

wherein photocurrent of the traveling-wave electroabsorption modulator is used to detect data and recover an electrical clock through the PLL[[]],

wherein the recovered electrical clock is used to modulate the traveling-wave electroabsorption modulator and generate an optical clock at a different wavelength[[]], and  
  
~~whereby~~ wherein said traveling-wave electroabsorption modulator operates simultaneously as a photodiode and a pulse generator.

Claim 10 (Currently Amended): An apparatus as recited in claim 9,  
  
wherein said traveling-wave electroabsorption modulator includes a first port coupled to the PLL ~~for outputting~~ and configured to output a photocurrent, and a second port coupled to the PLL,

wherein the photocurrent from the first port of said traveling-wave electroabsorption modulator provides a tone to said PLL, and

wherein said PLL provides a recovered electrical clock signal to a second port of said traveling-wave electroabsorption modulator.

Claim 11 (Original): An apparatus as recited in claim 9, wherein said optical clock is used for all optical 3R regeneration.

Claim 12 (Currently Amended): An apparatus for optical clock recovery, comprising:

a traveling-wave electroabsorption modulator; and

a phase-locked loop coupled to said traveling-wave electroabsorption modulator[[:]],

wherein photocurrent of the traveling-wave electroabsorption modulator is used to detect data and recover an electrical clock through the phase locked loop[[:]],

wherein the recovered electrical clock is used to modulate the traveling-wave electroabsorption modulator and generate an optical clock at a different wavelength[[:]],

wherein the photocurrent from a first port of said traveling wave electroabsorption modulator provides a tone to said phase-locked loop[[:]],

wherein said phase locked loop provides a recovered electrical clock signal to a second port of said traveling-wave electroabsorption modulator[[:]], and

~~whereby~~ wherein said traveling-wave electroabsorption modulator operates simultaneously as a photodiode and a pulse generator.

Claim 13 (Original): An apparatus as recited in claim 12, wherein said optical clock is used for all optical 3R regeneration.

Claim 14 (Currently Amended): An apparatus for simultaneous demultiplexing and optical pulse generation, comprising[[:]]:

a traveling-wave electroabsorption modulator (TW-EAM) including a first port for an optical input, a second port, a third port for an optical output, and a fourth port; and

a phase-locked loop (PLL) coupled to the TW-EAM,

wherein the second port of the TW-EAM is coupled to an input of the PLL and the fourth port of the TW-EAM is coupled to an output of the PLL[[:]],

wherein when the TW-EAM receives at the first port OTDM data of a first bit rate with a first wavelength and a continuous wave with a second wavelength, the TW-EAM produces at the second port a photocurrent having a tone of a fundamental frequency determined by the first bit rate[[:]],

wherein in response to the photocurrent, the PLL generates an electrical clock with a first frequency that is supplied to the fourth terminal of the TW-EAM, and

~~whereby~~ wherein the third terminal of the TW-EAM generates demultiplexed data of a second bit rate with the first wavelength and an optical clock with the first frequency and the second wavelength.

Claim 15 (Currently Amended): An apparatus ~~defined in~~ as recited in claim 14, wherein the TW-EAM functions as a photodetector and a modulator.

Claim 16 (Currently Amended): An apparatus ~~defined in~~ as recited in claim 14, wherein the first bit rate of the OTDM data is ~~on an order of~~ about 40 Gb/s.

Claim 17 (Currently Amended): An apparatus ~~defined in~~ as recited in claim 14, wherein the first frequency is determined by dividing the fundamental frequency by N (where N is a natural number larger than 1).

Claim 18 (Currently Amended): An apparatus ~~defined in~~ as recited in claim 17, wherein the second bit rate is determined by dividing the first bit rate by N.

Claim 19 (Currently Amended): An apparatus ~~defined in~~ as recited in claim 14, wherein the PLL includes a band-pass filter ~~for eliminating~~ configured to eliminate the tone.

Claim 20 (Currently Amended): An apparatus defined in claim 14, wherein the PLL includes a voltage controlled oscillator ~~whose~~ with a same frequency ~~is the same~~ as the first frequency.

Claim 21 (Currently Amended): An apparatus for optical clock recovery, comprising; a traveling-wave electroabsorption modulator (TW-EAM) including a first port for an optical input, a second port, a third port for an optical output, and a fourth port; and a phase-locked loop (PLL) coupled to the TW-EAM, wherein the second port of the TW-EAM is coupled to an input of the PLL and the fourth port of the TW-EAM is coupled to an output of the PLL[[:]],

wherein when the TW-EAM receives at the first port OTDM data of a first bit rate with a first wavelength and a continuous wave with a second wavelength, the TW-EAM produces at the second port a photocurrent having a tone of a fundamental frequency determined by the first bit rate[[:]],

wherein in response to the photocurrent, the PLL generates an electrical clock with a same frequency ~~that is the same~~ as the fundamental frequency and the electric clock signal is supplied to the fourth terminal of the TW-EAM,

~~whereby~~ wherein the third terminal of the TW-EAM generates an optical clock with ~~the a same~~ second frequency ~~that is the same~~ as the fundamental frequency.

Claim 22 (Currently Amended): An apparatus defined in claim 19, wherein the TW-EAM functions as a photodetector and a modulator.

Claim 23 (Currently Amended): An apparatus defined in claim 19, wherein the first bit rate of the OTDM data is ~~on an order of~~ about 40 Gb/s.